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Internal vaginal douching increases the incidence of vaginal infection among IUD users: a cross-sectional study

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Abstract

Background We compared the rate, type and severity of vulvovaginitis in women who are practicing internal vaginal douching (IVD) or not while using an intrauterine contraceptive device (IUCD).

It is a cross-sectional study on 604 consecutive attendees of the outpatient clinics using IUCD for at least 6 months prior to recruitment. Eligible participants were divided into two groups: group 1 (302 women) performing IVD and group 2 (302 women) not practicing this habit (NIVD). The frequency of vaginal infections in IUCD users who perform IVD compared to women who were abstaining from this habit was our primary outcome.

Results They are IUCD users who were practicing IVD more frequent history of vaginal infection (VI) compared with NIVD-IUCD users [260 (88.1%) versus 151 (43.4%); respectively] ($P < 0.001$). Current diagnosis of VI was significantly higher in IVD group (275; 91.05%) compared to NIVD group (115; 38.1%) ($P < 0.001$). Bacterial vaginosis was the most common infection (287; 47.5%) followed by candida vulvovaginitis (278; 46.03%). Moreover, both types of infections were significantly more common in IVD.

Conclusion The use of IUCD may not increase occurrence of vulvovaginitis, but IVD does increase vaginal infection rate either with or without IUCD use. When vaginal infection happens with IUCD, BV is the most common type of infection followed by *Candida albicans*.

Keywords Vaginal infection, Vaginal candidiasis, Bacterial vaginosis, Vaginal douching, Intrauterine contraceptive device

Background

Intrauterine device is one of the most prevalent and effective long-acting reversible contraception worldwide, and millions of intrauterine devices (IUDs) are inserted yearly. There are concerns that IUD use may increase

incidence of vaginal infections (VI), pelvic inflammatory disease (PID) and subsequent complications such as infertility and ectopic pregnancy among the (intrauterine copper device) IUCD users [1].

Internal vaginal douching (IVD) for personal hygiene and cleanliness has been widely accepted as a traditional habit among women. It included flushing of fluid into vagina using specific introducer or finger to clean vagina after intercourse or appearance of abnormal vaginal discharge [2]. However, this habit has its adverse effect on vaginal flora and increasing incidence of vulvovaginitis.

Many women thought that IVD is a beneficial health activity. They believed it improves their hygiene and

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cleanliness and treat abnormal vaginal discharge [3, 4]. Moreover, women used this habit for religious reason (Ghusul), to prevent pregnancy or before and after intercourse [5, 6]. Different types of douches were used like water only or with soap in Muslim countries, home mixed solution like water/vinegar and water/soda or some commercial products in developed countries [2, 5, 7]

To date, several studies investigated the adverse effect of vaginal douching. Authors reported that it altered the vaginal microflora and PH resulting in vulvovaginitis and pelvic inflammatory disease. It is worth mentioning that bacterial vaginosis was the commonest infection, which adversely affects pregnancy outcomes (abortion, premature rupture of membranes and preterm labour) [7–10].

Furthermore, one of the beliefs in the mind of IUCD users and some treating physicians is that the device itself may be a cause of increase vulvovaginal infections. However, we hypothesised that it is not the IUCD but the accompanying vaginal manipulation “IVD” that may be performed by these ladies or their internal vaginal manipulation to detect the threads of the IUCD may be behind this infection.

This study was conducted to compare the frequency, type and severity of vulvovaginitis in women who are performing IVD or not while using an IUCD.

Methods

Trial registration

The study protocol was registered in ClinicalTrial.gov (registration no. NCT03261804, registration date: 25 August 2017) and approved by the Assiut University Medical Ethical Committee.

Study participants

This cross-sectional study was conducted at Women's Health Hospital and El-Eman General Hospital, Assiut, Egypt, during the period between June 2018 and August 2021. We included women aged 18–48 years old attending the outpatient clinic of the above hospitals for follow-up or any complaint. We included women who were currently using IUCD (copper T380A (CU-IUD) for at least 6 months before the study recruitment. Every effort had been exhausted to ensure the type of the IUD currently in use by patients' follow-up card, clinic report and vaginal USG if not recorded. Exclusion criteria included women who used a contraceptive method other than IUCD; women with endocrine disease/s (DM, thyroid disease); patients with known autoimmune diseases, or chronic immunosuppressive therapy; and those under chemotherapy for treatment of cancer. All eligible women gave a written consent before study began.

Study outcomes

The primary outcome was to compare frequency of VI in IUCD user who is using IVD or not, while in secondary outcomes were included the type and severity of infection in both groups.

All eligible women were invited to personal interview. A detailed history was taken, and included participants were asked about their personal hygiene including if they used to perform IVD or not, how they were performing this IVD (by hand, water, jet, pump), how frequent they are doing so and, finally, why they performed this IVD.

Study groups

Women who completed the questionnaire were stratified into two groups: group 1 (IVD) and group 2 [no internal vaginal douching (NIVD)]. Both groups were compared for frequency, recurrence and type of vaginal infections. All recruited participants were examined by a specialist for evidence of current VI and all the required investigations and treatment according to the hospital protocols. Vulvovaginitis is defined as the presence of discharge, itching, pain, odour, dysuria and/or dyspareunia [11].

Sample collection, handling and transport

A sterileusco vaginal speculum was inserted into the vagina, and characteristics of the discharge (with respect to amount, odour and type of discharge) were evaluated by an experienced clinician. Samples of the vaginal discharge were collected by dry sterile cotton swabs were tested for PH.

Two slides were prepared from each sample: one for detection of the presence or absence of a fishy amine odour on addition of 10% KOH (whiff test) and the other fixed for gram staining. The fixed slide and swab tubes were transported to the Department of Microbiology and Immunology for microscopic examination and culture.

Direct microscopic examination and culture of collected specimens

It is a gram staining of the fixed slide and examination under oil immersion lens for detection of clue cells (epithelial cells covered with small gram-negative rods). The presence of clue cells was considered positive by the Amsel criteria. In addition, examination for the presence or absence of budding yeast cells was done.

Culture of collected specimens

Each swab was incubated overnight in Sabouraud dextrose broth, then streaked on the surface of Sabouraud

dextrose agar (SDA) plates (HiMedia Company, India) and then incubated at 37 °C for 24–48 h to detect white creamy pasty colonies of *Candida*. The growth of *Candida* was confirmed by microscopic examination. Description of Amsel criteria. This comprised fulfilling any three of the following four criteria: the presence of homogeneous vaginal discharge, pH > 4.5, positive whiff test and the presence of clue cells on vaginal wet smear.

Sample size calculation

Calculation of the sample size using Epi. Info to detect the frequency of vaginal infection in IUD users and no users. Previous study demonstrated that incidence of bacterial vaginosis infection in IUD, with two-sided confidence level 95% and power 80% giving a total sample size of 608 IUD users, 304 performing internal vaginal douching and 304 not performing internal vaginal douching [12].

Statistical analysis

Data record and evaluation were managed using SPSS software (Statistical Package for the Social Sciences

(SPSS Inc., Chicago, IL, USA, version 24). Data were presented in the form of either absolute numbers, percentage from the total in the column, mean value or standard deviation of the mean. We used chi-square test to compare qualitative data. Furthermore, we had used independent sample *t*-test to compare quantitative variables. *P*-value less than 0.05 is interpreted as a statistically significant value.

Results

Baseline characteristics

A total of 1464 women attended designated family planning outpatient clinics, of which 604 were included in our study. The rest of cases were excluded for the following reasons: using other contraceptive method ($n=681$), endocrine disease ($n=12$), under chemotherapy ($n=2$) and antibiotic or steroid ($n=167$) (Fig. 1). Baseline characteristics of included participants are detailed in Table 1. The mean age for IVD group was 34.29 ± 7.82 versus NIVD 33.42 ± 7.44 .

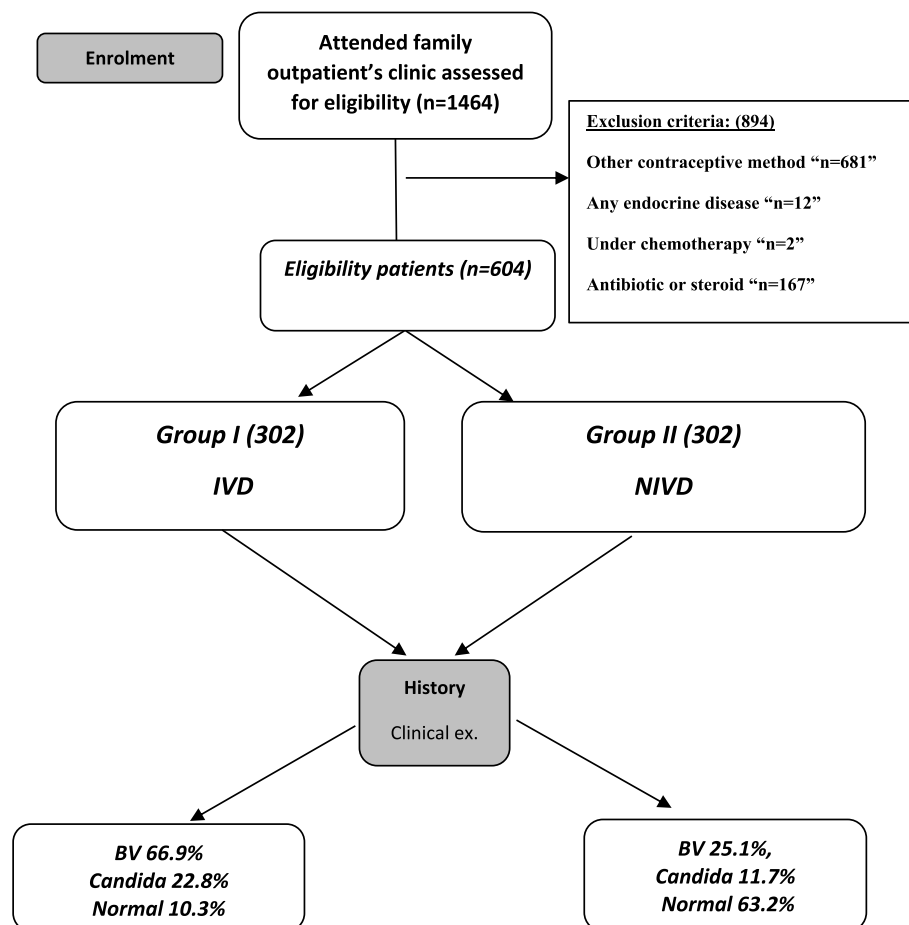


Fig. 1 Study flow chart. IVD, vaginal douching; NIVD, nonvaginal douching; BV, bacterial vaginosis

Table 1 Demographic and obstetric data among IUD users in both groups

Item	IVD (n = 302)	NIVD (n = 302)	p-value
Age (mean ± SD)	34.29 ± 7.82	33.42 ± 7.44	P = 0.145
Residence			
• Rural	229 (75.82%)	121 (40.06%)	P < 0.000*
• Urban	73 (24.17%)	181 (59.93%)	
Occupation			
• Not working	242 (80.13%)	88 (29.13%)	P < 0.005*
• Working	60 (19.86%)	214 (70.86%)	
Total parity (mean ± SD)	3.89 ± 1.41	3.92 ± 1.69	P = 0.835
Previous abortion (mean ± SD)	1.92 ± 1.13	1.07 ± 0.27	P < 0.000*
History of preterm labor	24 (7.94%)	6 (1.98%)	P < 0.001*
Mode of last delivery			
Vaginal	213 (70.30%)	190 (63.0%)	P < 0.029*
CS	89 (29.47%)	112 (37.0%)	

*P < 0.05 statistically significant

IVD Internal vaginal douching, NIVD Non-internal vaginal douching, CS Caesarean section

History and frequency of vaginal infection

Group 1 (IVD) reported a significant positive history of vaginal infection (86.1%) when compared to group 2 (NIVD) (43.4%) ($P < 0.000$). Moreover, IVD group reported significant frequent attack of vulvovaginitis compared to NIVD group ($P < 0.005$). Furthermore, women performing IVD experienced abnormal vaginal discharge (odour ($n = 160$) and colour ($n = 275$)) more than women abstaining this habit (odour ($n = 48$) and colour ($n = 129$)).

Types of vaginal infection

Bacterial vaginosis (BV) was the most common infection (IVD group $n = 202$, 66.88% versus NIVD group $n = 75$, 24.80%) followed by candidiasis (IVD group $n = 69$, 22.84% versus IVD group $n = 35$, 11.58%). Interestingly, both types of infection were higher among IVD group (Table 2).

There was a significant higher rate of vaginal infection in IVD group as compared to NIVD group whether

Table 2 Types of vaginal infection in the two studied groups after IUD insertion

Item	IVD group (n = 302)	NIVD group (n = 302)	p-value
• BV	202 (66.88%)	75 (24.80%)	P < 0.000*
• Candida infection	69 (22.84%)	35 (11.58%)	
• Normal	31 (10.26%)	191 (63.24%)	

IVD Vaginal douching, NIVD Nonvaginal douching, BV Bacterial vaginosis

*P < 0.05 statistically significant

Table 3 Comparison of vaginal infection rate between IVD and NIVD before and after IUD insertion

	IVD (n = 302)	NIVD (n = 302)	p-value
Before IUD insertion	260 (86.1%)	151 (43.70%)	P < 0.001*
After IUD insertion	275 (90.39%)	115 (38.1%)	P < 0.001*
P-value	P = 0.268	P = 0.759n	

IVD Vaginal douching, NIVD Nonvaginal douching

*P < 0.05 statistically significant

before or after IUD insertion. However, within the same group (IVD or NIVD), the rate of VI was not significantly different from before to after IUD insertion (Table 3).

Changes in menstrual pattern in IUD users performing VI

There was no significant difference between both groups regarding regularity of menstrual cycles. However, it was longer in duration in NIVD group. Interestingly, women (IVD) reported significant increase in intermenstrual bleeding and pelvic pain symptoms.

Discussion

This study is a cross-sectional study of the effect of IVD habit on the type, frequency and complication of vaginal infection before and after IUCD use. Our results may raise more concerns about the risks of this habit specially during intrauterine device use as it may increase the rate of vaginal infection and its frequency with all its consequences.

In our study, the majority (three quarters) of women who performed IVD were of rural background. Our study was consistent with Güzel et al. study which was conducted in rural areas and showed that 91.6% of women perform IVD due to religious reasons [6]. Furthermore, the habit of IVD was more predominant among housewives (80.13%). Our study is consistent with other articles which reported that most women who performed this habit were unemployed and of low socioeconomic [5, 13].

Vaginal flora is responsible for developing a unique vaginal milieu that resist the development of different types of vulvovaginitis. Internal vaginal douching may have a detrimental effect on this unique ecosystem. In Rothman and colleague (2003), the frequency of vaginal infection was higher in women using soap containing solution compared with those using water alone [14]. In our study, there was a significant more frequent history of vaginal infection in IVD group compared with NIVD group. This agrees with previous study which reported the following: women who adopted this habit were also almost four times at higher risk of ectopic pregnancy and twice likely to develop cancer cervix and 1.7 times

more likely to have sexually transmitted infections (STIs) [15, 16].

Our work in Assiut showed that 91.05% of douchers have abnormal vaginal discharges compared with 42.71% in the no douching group. In the present study, BV was significantly higher in IVD group compared with NIVD group both clinically and after bacteriological confirmation. This may be due to the fact that IVD may lead to a change of the vaginal ecosystem. Our study showed a significant increase in the rate of VI (specifically BV and VVC) in IVD group compared with NIVD either as they recall from the history before IUD use or after insertion of the IUCD as evident by clinical and bacteriological examination.

In present study, BV diagnosed in 74.9% of women performing IVD have compared with 70.43% in NIVD group. This agrees with Hutchinson and co-authors who reported that vaginal douching increased the incidence of BV [17]. This may be due to that IVD led to change of the vaginal ecosystem, and this is consistent with our results. Our results conform with previous reports that pointed to increased risk of BV in women performing VD compared with those not performing this habit [15].

This can be interpreted that allegation IUCD may increase incidence of VI may not be true. It might be the accompanying IVD as we noticed no significant change in the rate of VI within each group (IVD or NIVD) from before to after IUCD insertion. We assume that the unnecessary doctors' advice of checking the threads of IUD after its insertion and after the end of each cycle may be the reason behind increasing the habit among IUD users. It is the advice that should be changed to regular checks of IUD by ultrasound every certain period.

The limitations of the current study included the mixed retrospective recall of the history of VI with the prospective diagnosis of VI either clinically or bacteriologically. Furthermore, there were technique difficulties in looking for trichomonas vaginalis infection, the third common cause of VI. But theoretically, we can believe that it goes with the same effect of IVD on BV.

Conclusion

The use of IUCD may not increase occurrence of vulvo-vaginitis, but IVD does increase vaginal infection rate either with or without IUCD use. When vaginal infection happens with IUCD, BV is the most common type of infection followed by *Candida albicans*.

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Authors' contributions

AAY, design of the work, analysis, interpretation of data, have drafted the work and substantively revised it. OMS, design of the work, analysis, interpretation

of data, have drafted the work and substantively revised it. MK, conducting the study, recruiting participants and data collection. AS, conducting the bacteriological laboratory work. AMA, design of the work, analysis, interpretation of data, have drafted the work and substantively revised it. AAM, interpretation of data, have drafted the work and substantively revised it.

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Availability of data and materials

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

Declarations

Ethics approval and consent to participate

The study was approved by Assiut University Medical Ethical Committee, and consent was obtained from all participants before recruitment.

Consent for publication

N/A.

Competing interests

The authors declare that they have no competing interests.

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References

1. Yen S, Shafer MA, Moncada J, Campbell CJ, Flinn SD, Boyer CB (2003) Bacterial vaginosis in sexually experienced and non-sexually experienced young women entering the military. *Obstet Gynecol* 102:927–933. [https://doi.org/10.1016/s0029-7844\(03\)00858-5](https://doi.org/10.1016/s0029-7844(03)00858-5)
2. Hacıoğlu N, Nazik E, Kılıç M (2009) A descriptive study of douching practices in Turkish women. *Int J Nurs Pract* 15:57–64. <https://doi.org/10.1111/j.1440-172X.2009.01735.x>
3. Khodary MM, Shazly SA, Ali MK, Badee AY, Shaaban OM (2013) The patterns and criteria of vaginal douching and the risk of preterm labor among upper Egypt women. *J Low Genit Tract Dis*. <https://doi.org/10.1097/LGT.0b013e31826febb0>
4. Diclemente RJ, Young AM, Painter JL, Wingood GM, Rose E, Sales JM (2012) Prevalence and correlates of recent vaginal douching among African American adolescent females. *J Pediatr Adolesc Gynecol* 25:48–53. <https://doi.org/10.1016/j.jpog.2011.07.017>
5. Karaer A, Avsar AF, ÖZKAN, Ö., Bayir, B., & Sayan, K. (2005) Vaginal douching practice in Turkish women: who is douching, and why? *Aust N Z J Obstet Gynaecol* 45:522–525. <https://doi.org/10.1111/j.1479-828X.2005.00490.x>
6. Güzel AI, Kuyumcuoğlu U, Celik Y (2011) Vaginal douching practice and related symptoms in a rural area of Turkey. *Arch Gynecol Obstet* 284:1153–1156. <https://doi.org/10.1007/s00404-010-1805-6>
7. Cottrell BH (2006) Vaginal douching practices of women in eight Florida panhandle counties. *J Obstet Gynecol Neonat Nurs* 35:24–33. <https://doi.org/10.1111/j.1552-6909.2006.00003.x>
8. Brotman RM, Klebanoff MA, Nansel TR, Andrews WW, Schwebke JR, Zhang J, Scharfstein DO (2008) A longitudinal study of vaginal douching and bacterial vaginosis—a marginal structural modeling analysis. *Am J epidemiol* 168:188–196. <https://doi.org/10.1093/aje/kwn103>
9. Lowe NK, Ryan-Wenger NA (2006) Factors associated with vaginal douching in military women. *Mil Med* 171:1015–1019. <https://doi.org/10.7205/milmed.171.10.1015>
10. Thorp JM Jr, Dole N, Herring AH, McDonald TL, Eucker B, Savitz DA, Kaczor D (2008) Alteration in vaginal microflora, douching prior to pregnancy, and preterm birth. *Paediatr Perinat Epidemiol* 22:530–537. <https://doi.org/10.1111/j.1365-3016.2008.00970.x>
11. Sheppard C (2020) Treatment of vulvovaginitis *Aust prescr* 43:195. <https://doi.org/10.18773/austprescr.2020.055>

12. do Lago R. F., Simões J. A., Bahamondes L., Camargo R. P., Perrotti M., Monteiro I. (2003) Follow-up of users of intrauterine device with and without bacterial vaginosis and other cervicovaginal infections. *Contraception* 68:105–109. [https://doi.org/10.1016/s0010-7824\(03\)00109-4](https://doi.org/10.1016/s0010-7824(03)00109-4)
13. Yıldırım R, Vural G, Koçoğlu E (2020) Effect of vaginal douching on vaginal flora and genital infection. *J Turk Ger Gynecol Assoc* 21:29. <https://doi.org/10.4274/jtgga.galenos.2019.2018.0133>
14. Rothman, K. J., Funch, D. P., Alfredson, T., Brady, J., & Dreyer, N. A. (2003) Randomized field trial of vaginal douching, pelvic inflammatory disease and pregnancy. *Epidemiol* 340–348. <https://pubmed.ncbi.nlm.nih.gov/12859036>
15. Shaaban OM, Youssef AEA, Khodry MM, Mostafa SA (2013) Vaginal douching by women with vulvovaginitis and relation to reproductive health hazards. *BMC Womens Health* 13:1–6. <https://doi.org/10.1186/1472-6874-13-23>
16. Fonck K, Kaul R, Keli F, Bwayo JJ, Ngugi EN, Moses S, Temmerman M (2001) Sexually transmitted infections and vaginal douching in a population of female sex workers in Nairobi, Kenya. *Sex Transm Infect* 77:271–275. <https://doi.org/10.1136/sti.77.4.271>
17. Hutchinson, K. B., Kip, K. E., & Ness, R. B. (2007). Vaginal douching and development of bacterial vaginosis among women with normal and abnormal vaginal microflora. *Sex transm dis* 671–675. <https://doi.org/10.1097/01.olq.0000258435.34879.da>

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